

7995-A2-374
SHDSL-Serial NTU
User's Guide

Document Number 7995-A2-GB21-00

September 2004

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Table of Contents

Chapter 1	Introduction	7
1.1	Overview	7
1.2	Features	8
1.3	Application	9
1.4	Front Panel LED Indicators	10
Chapter 2	Hardware Installation.....	11
2.1	Rear Panel Connectors.....	11
2.2	Pin Assignments	12
2.3	Installation	14
Chapter 3	Management	15
3.1	Console Management	15
3.2	Telnet Management.....	17
3.3	SNMP Management	17
Chapter 4	System Setup	18
4.1	Login	18
4.2	Main Menu	20
4.3	Configuration	20
4.4	Logout	25
4.5	Selecting a Device	27
4.6	Selecting NE Mode	28
Chapter 5	Monitoring.....	29
5.1	DTE Status Monitoring	29
5.2	Threshold Setup	32
5.3	Alarm Monitoring	33
Chapter 6	Loopback and Test.....	34
6.1	Loopback.....	34
6.2	V.35 Loopback.....	37
6.3	BER Test.....	38
6.4	Self-Test	38
Chapter 7	Configuration Database	39
7.1	Saving Configurations.....	39
7.2	Uploading Configuration Database via X-modem.....	40
7.3	Uploading Configuration Database via TFTP	40
7.4	Downloading Configuration Database Via X-modem	41
7.5	Downloading Configuration Database via TFTP	42
7.6	Setting Configuration Database to Factory Default	42

Chapter 8	System Reset and Software Download	43
8.1	Reset	43
8.2	Software Download via X-modem	43
8.3	Software Download via TFTP	44
8.4	Remote Software Upgrade via TFTP	45
Chapter 9	Troubleshooting	46
Specifications		47

List of Figures

Figure 1—1 Applications of the 7995-A2-374	9
Figure 1—2 7995-A2-374 Front View	10
Figure 2—1 7995-A2-374 Rear Panel Connectors	11
Figure 3—1 Main Menu	15
Figure 4—1 Main Menu	18
Figure 4—2 Configuration Menu	20
Figure 4—3 System Configuration Screen	21
Figure 4—4 Management Port Configuration Screen	21
Figure 4—5 System Date and Time Setting Screen.....	22
Figure 4—6 Password Configuration Screen	22
Figure 4—7 SNMP and TFTP Configuration Screen.....	24
Figure 4—8 SHDSL Interface Configuration Screen	24
Figure 4—9 V.35 Interface Configuration Screen	25
Figure 4—10 System Logout.....	25
Figure 5—1 Operation Mode Indication.....	26
Figure 5—2 Select Device Menu	27
Figure 5—3 Remote Device Configuration Main Menu	27
Figure 5—4 Select NE Mode Menu	28
Figure 6—1 DTE Status Screen	29
Figure 6—2 Performance Data Menu	30
Figure 6—3 Near-End Current Quarter Screen.....	30
Figure 6—4 Near-End Previous 96 Quarters Performance Screen.....	31
Figure 6—5 Near-End Current & Previous 7 Days Performance Screen	31
Figure 6—6 Reset Near-End Performance Data Screen.....	32
Figure 6—7 Threshold Setup Screen	32
Figure 6—8 Current Alarm Status Screen	33
Figure 6—9 Alarm History Screen.....	33
Figure 7—1 Test and Loopback Status Menu	34
Figure 7—2 Loopback Menu.....	34
Figure 7—3 SHDSL Local Loopback.....	35
Figure 7—4 SHDSL Line Loopback	35
Figure 7—5 SHDSL Remote Line Loopback.....	35
Figure 7—6 SHDSL Remote Payload Loopback.....	36
Figure 7—7 BER Test Screen.....	38
Figure 8—1 Configuration Database Maintenance Menu	39
Figure 9—1 Reset & Software Download Menu.....	43

Chapter 1 Introduction

1.1 Overview

This user's guide provides general information about the features, functions and operation of the 7995-A2-374 SHDSL NTU.

The 7995-A2-374 is a SHDSL NTU, which utilizes SHDSL technology combining the best of 2B1Q SDSL and HDSL2 to achieve a faster and more efficient data transmission in both directions over a single copper telephone pair.

The 7995-A2-374 provides an industry standard V.35 interface. Based on TC-PAM coding, the 7995-A2-374 supports multiple transmission rates up to 2,320 kbps. In addition to software configurable line rate, the 7995-A2-374 also supports rate adaptation function. It is suitable for leased line applications such as video conferencing, Internet access, and digital data network (DDN) access.

Featuring remote control capability, the local 7995-A2-374 is able to perform configuration, PM monitoring, querying, diagnostics, and all maintenance functions over the remote NTU via the DSL line.

1.2 Features

- Full remote control capability via SHDSL Embedded Operation Channel
- Complies with ITU-T G.991.2 (G.SHDSL)
- Data rate: Nx64 kbps (N = 1–36)
- Versatile loopbacks for diagnostics, including V.54
- Auto-negotiation rate adaptation
- Built-in test pattern generator and detector
- SHDSL line performance monitoring (PM)
- 96-quarter-hour/7-day PM storage
- Local control via RS-232 management port
- SNMP management through Ethernet LAN port

1.3 Application

Figure 1-1 shows the applications of the 7995-A2-374 SHDSL NTU.

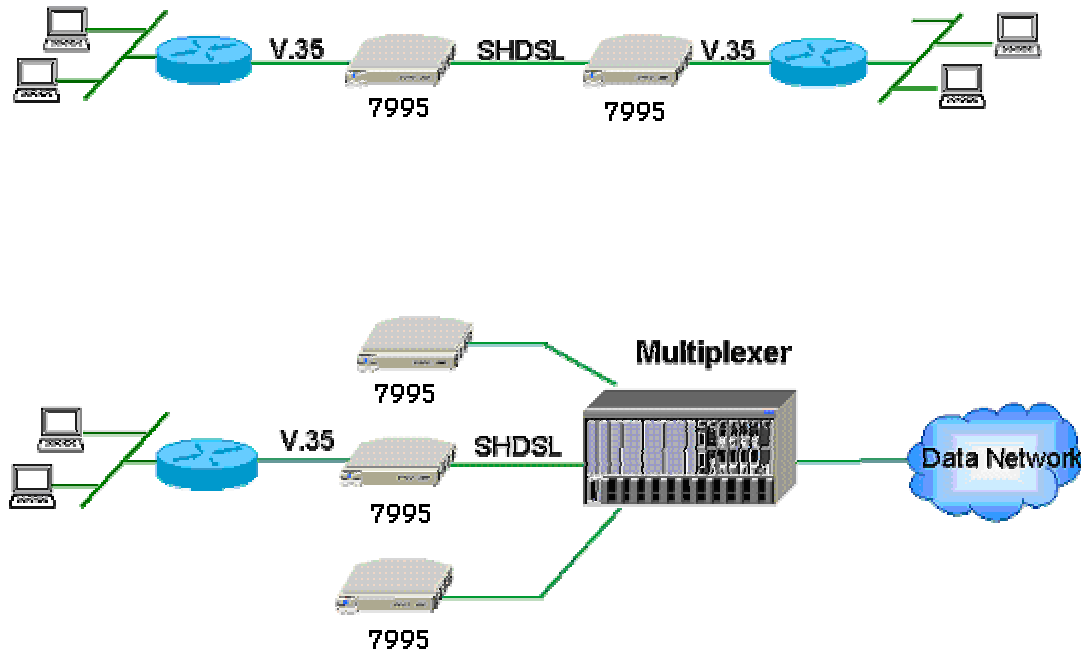


Figure 1—1 Applications of the 7995-A2-374

1.4 Front Panel LED Indicators

The LED indicators indicate power status, diagnostics, machine status, data activity, and alarm conditions.



Figure 1—2 7995-A2-374 Front View

LED Indicator	Color	Mode	Function
POWER	Green	On	Power is supplied
		Off	No power is connected
TEST	Green	On	Bit Error testing
		Blink	Self testing
		Off	Normal operation
NT	Green	On	NT mode enabled
		Off	LT mode enabled
ALARM	Red	On	Major alarm detected
		Off	No major alarm detected
LB	Yellow	On	Loopback testing
		Blink	V.54 loopback testing
		Off	Normal operation
RD & TD	Green	On	Data transmitted/received
		Off	No Data transmitted/received
DTE	Green	On	DTE connected
		Off	No DTE connected
DSL LOS	Red	On	Loss of signal (DSL link is out of service)
		Blink	DSL link is connecting
		Off	DSL link is connected
ERR	Yellow	On	Self-test error
		Blink	Bit error test error
		Off	Normal operation

Table 1-1 7995-A2-374 LEDs

Note: The average training period for the SHDSL line is one minute and forty seconds. If the training period exceeds three minutes or it fails (the DSL LOS LED keeps blinking), it means the line quality is poor or the link distance is too long for the SHDSL NTU to train.

Chapter 2 Hardware Installation

2.1 Rear Panel Connectors

Figure 2-1 displays the 7995-A2-374 rear panel connectors, which are described in Table 2-1.



Figure 2—1 7995-A2-374 Rear Panel Connectors

Interface	Description
On/Off	On position: turn on the power. Off position: turn off the power.
Power	Connect to the power adapter.
Console	DB-9 female connector connected to a PC COM port.
LAN	RJ45 connector for SNMP network management
V.35	Connect to a router.
LINE	RJ45 connector for SHDSL connection

Table 2-1 7995-A2-374 Rear Connectors

2.2 Pin Assignments

■ Console port cable

Pin	Definition	Pin	Definition
1	-	6	-
2	TD	7	-
3	RD	8	-
4	-	9	-
5	GND		

Table 2-2 Console Port Pin Assignments

■ LINE port

Pin	Definition	Pin	Definition
1	-	6	-
2	-	7	-
3	-	8	-
4	Tip	9	-
5	Ring		

Table 2-3 LINE Port Pin Assignments

■ V.35 interface

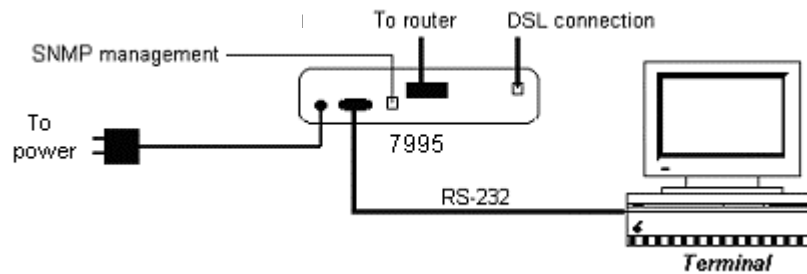
Source	Pin	Definition	Pin	Definition	Source
Common	1	Chassis Ground	2	Signal Ground	Common
DTE	3	Request to Send	4	Clear to Send	DCE
DCE	5	Data Set Ready	6	Data Carrier Detect	DCE
DTE	7	Data Terminal Ready	8	Ring Indicator	DCE
-	9-11	Not Used	10-12	Not Used	-
DTE	13	Transmitted Data (A)	14	Receive Data (A)	DCE
DTE	15	Transmitted Data (B)	16	Receive Data (B)	DCE
DTE	17	Terminal Timing (A)	18	Receive Timing (A)	DCE
DTE	19	Transmitted Timing (B)	20	Receive Timing (B)	DCE
DCE	21	Transmitted Timing (A)	22-34	Not Used	-
DCE	23	Transmit Timing (B)			
-	25-33	Not Used			

Table 2-4 V.35 Interface Pin Assignments

2.3 Installation

The hardware installation consists of the following steps.

- Step 1** Connect the LINE port to your DSL line.
- Step 2** Connect the LAN port to the SNMP management network with an RJ45 connector cable.
- Step 3** Connect the V.35 interface to the router.
- Step 4** Connect the Console port to the VT100 compatible terminal with an RS232 cable.
- Step 5** Connect the Power jack to the power adapter with the power adapter cord.
- Step 6** Attach the power adapter to the wall outlet or other AC source. Then turn on the power switch on the rear panel.
- Step 7** After power on, the 7995-A2-374 performs a self-test. During the Self-test, all LEDs will keep flashing back and forth sequentially. The test items include system RAM, flash memory and application software. If an error is found in RAM, the ALARM LED will be ON. If an error is found in flash memory or application software, the ALARM LED will keep flashing.



Caution: If the SHDSL NTU fails to power on, or it malfunctions, first verify that the power supply is correctly connected, and then power it on again.

Chapter 3 Management

This chapter describes the three ways to manage the SHDSL NTU: Console, Telnet, and SNMP. Chapters 4 through 6 introduce how to configure and maintain the SHDSL NTU in a console or Telnet session.

3.1 Console Management

Configure the following parameters for your VT100-compatible terminal emulation program:

- Baud rate: 38,400 bps
- Parity: None
- Data bits: 8
- Stop bit: 1
- Flow control: None

After the session parameters are set up, run the VT100 terminal emulation program on your PC. The **Press Any Key to Login...** message will be shown on the middle of the screen. Press any key. When a login prompt appears, type a password and then press the **Enter** key to display the main menu as shown below. (No password is required for the initial login.)

```
SHDSL/V35 DSU          HW Version:1.06      SW Version:2.08
NE Mode: LT           Selected Device: Local  Name:
                                     14:05:00 06/23/2004

MAIN MENU
  Select Device
  Select NE Mode(LT/NT)
  Configuration
  Current Alarm & Status
  Performance Statistics
  Threshold Setup
  Alarm History
  DTE Status
  Test & Loopback Status
  Configuration Database Maintenance
  Reset & Software Download
  Logout

Up, Down Arrow: Field Move; Ctrl+X: Exit; Enter: Confirm      <WRITE>
```

Figure 3—1 Main Menu

Press the **Up** and **Down** arrow keys to select the fields, and press the **Left** and **Right** arrow keys to select the parameters of fields. Press <**Ctrl-X**> to exit and <**Enter**> for confirmation.

The main menu includes the following fields:

- Select Device (Local/Remote): Select the SHDSL NTU to be configured. (Only appears in LT node.)
- Select NE Mode (LT/NT): Select NT or LT operation mode.
- Configuration: Configure system parameters.
- DTE Status: Show DTE signal status.
- Performance Data: Show the statistics of performance monitoring.
- Performance Threshold: Set the day and quarter threshold.
- Current Alarm Status: Show the status of current alarms.
- Alarm History: View all of the alarm records.
- Clear Alarm History: Clear all of the alarm records.
- Test & Loopback Status: Perform a loopback test, BER test, and self-test.
- Configuration Database Maintenance: Upload, download, save the configuration database, and restore the configuration database to factory defaults.
- Reset & Software Download: Perform a system reset or software download.
- Logout: Exit the system.

3.2 Telnet Management

Configuration can also be performed using Telnet. To access the SHDSL NTU via Telnet, follow the steps below:

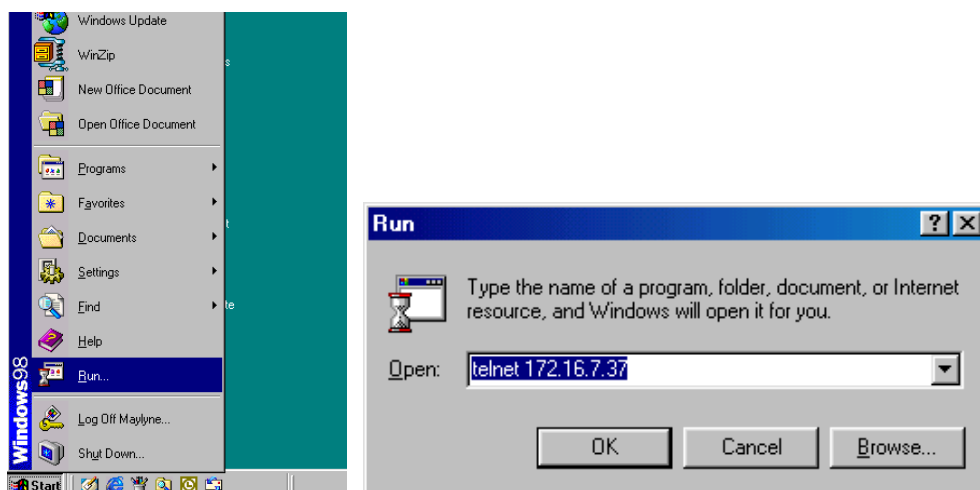
STEP 1: Connect the SHDSL NTU's LAN port to the Network Interface Card (NIC) in a PC using a crossover cable, or to an Ethernet hub using a straight-through cable.

STEP 2: In Windows, click Start and choose Run. Type:

telnet xxx.xxx.xxx.xxx

where xxx.xxx.xxx.xxx is the IP address of your SHDSL NTU. The default NTU IP address is **172.16.7.37**.

STEP 3: Refer to Chapters 4 to 6 to configure and maintain the SHDSL NTU.



3.3 SNMP Management

To manage the NTU using SNMP, follow the steps below:

STEP 1: Connect the SHDSL NTU's LAN port to the Network Interface Card (NIC) in a PC using a crossover cable, or to an Ethernet hub using a straight-through cable.

STEP 2: Start your SNMP MIB browser.

Chapter 4 System Setup

4.1 Login

Configure the following parameters for your terminal or VT100 terminal emulation program.

- **Console session parameters** (factory default)

Baud rate: 38400 bps

Parity: None

Data bits: 8

Stop bit: 1

Flow control: None

After the session parameters are set up, run the VT100 terminal emulation program on your PC. The **Press Any Key to Login...** message will be shown on the middle of the screen. Press any key. When a login prompt appears, type a password and then press the **Enter** key to display the main menu as shown below. (No password is required for the initial login.)

```

SHDSL/V35 DSU          HW Version:1.06      SW Version:2.08
NE Mode: LT            Selected Device: Local  Name:
                                      14:05:00 06/23/2004

MAIN MENU
  Select Device
  Select NE Mode(LT/NT)
  Configuration
  Current Alarm & Status
  Performance Statistics
  Threshold Setup
  Alarm History
  DTE Status
  Test & Loopback Status
  Configuration Database Maintenance
  Reset & Software Download
  Logout

Up, Down Arrow: Field Move; Ctrl+X: Exit; Enter: Confirm      <WRITE>

```

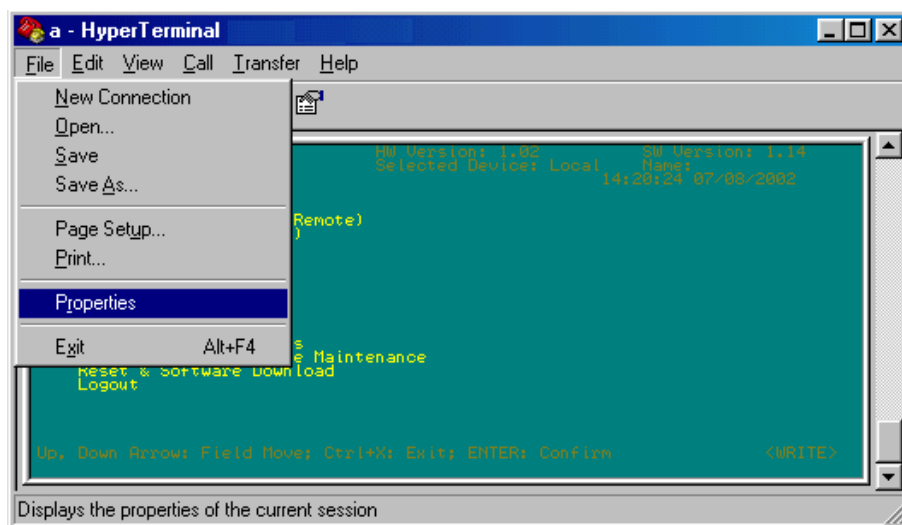
Figure 4—1 Main Menu

Note: HyperTerminal

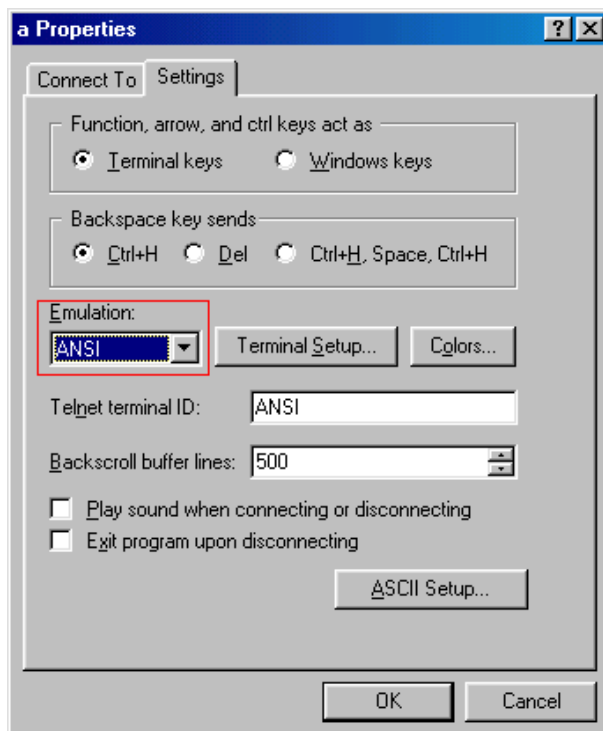
If you use HyperTerminal (provided with Windows 98/ME/2000), follow the steps below to change its Emulation mode to ANSI.

STEP 1: Activate the HyperTerminal window after the baud rate, parity, data bit, stop bit, flow control bit are set up.

STEP 2: Click **File>Properties** to access the Properties window.



STEP 3: Click on the Settings tab on the Properties window. On the new window, select ANSI in the Emulation field and click OK to complete the setting and return to the main window to use HyperTerminal.



4.2 Main Menu

Press the **Up** and **Down** arrow keys to select the fields, and press the **Left** and **Right** arrow keys to select the parameters of fields. Press <**Ctrl-X**> to exit and <**Enter**> for confirmation.

The main menu includes the following fields:

- Select Device: Choose the local or remote SHDSL NTU to be configured. This field is only available in LT mode.
- Select NE Mode (LT/NT): Select LT or NT operation mode. The factory default is LT mode.
- Configuration: Configure system parameters.
- Current Alarm Status: Show the status of current alarms.
- Performance Statistics: Show the statistics of performance monitoring.
- Threshold Setup: Set the thresholds for system performance monitoring.
- Alarm History: View and clear alarm records.
- DTE Status: Show DTE signal status.
- Test & Loopback Status: Perform a loopback test, BER test, and self-test.
- Configuration Database Maintenance: Upload, download and save the configuration database, and set the configuration database to factory defaults.
- Reset & Software Download: Perform a system reset or software download.
- Logout: Exit the system.

4.3 Configuration

After you log in to the SHDSL NTU, press the **Up** or **DOWN** arrow key to select the **Configuration** field from the main menu and then press the **Enter** key to go to the Configuration Menu.

Figure 4-2 shows the contents of the configuration menu.

```

CONFIGURATION MENU                                Exit
System Configuration
Management Port Configuration
System Date and Time Setting
Change Password
SNMP Configuration
SHDSL Configuration
V.35 Configuration

```

Figure 4—2 Configuration Menu

4.3.1 System configuration

Select **Main Menu>Configuration>System Configuration** to go to the System Configuration screen shown in Figure 4-3. The following options can be configured there:

- **Device Name:** Enter proper characters for system identification. The maximum length for device name is eight characters. Only alphabetic and numeric characters are valid.
- **Timing Source:** Different NE modes provide different options of the timing source. In LT Mode, the options are: **Internal**, **SHDSL_LOOP**, and **DTE_LOOP**. In NT Mode, the options are **Internal**, **SHDSL_LOOP**, **DTE_LOOP**, and **Independent**. To receive the clock from the V.35 interface at both sides, both of the 7995-A2-374 devices should be set to Independent.

After making a selection, use the **Up** or **Down** arrow key to exit or confirm the setting.

```
CONFIGURATION MENU                                Exit      Confirm
Device Name:
Current Timing Source:      INTERNAL
Timing Source:             Internal SHDSL_LOOP DTE_LOOP Independent
```

Figure 4—3 System Configuration Screen

4.3.2 Console Port Configuration

Select **Main Menu>Configuration>Management Port Configuration** to go to the Management Port Configuration screen shown in Figure 4-4. The factory-defaulted setting of Baud Rate is 38400 bps. Press the **Left/Right** arrow key to select Baud Rate and use the **Up** or **Down** arrow key to exit or confirm the setting.

```
MANAGEMENT PORT CONFIGURATION      Exit  Confirm

Baud Rate:                        9600 19200 38400 57600 115200
Start Bit:                        1 bit
#Bits and Parity:                 8 bits, No parity
Stop Bit:                        1 bit
XON/XOFF:                        On
```

Figure 4—4 Management Port Configuration Screen

4.3.3 System Date and Time Setting

Select **Main Menu>Configuration>System Date and Time Setting** to go to the System Date and Time Setting screen shown in Figure 4-5.

```

SYSTEM DATE AND TIME SETTING
                                Exit Confirm
                                Synchronize Remote Date & Time

System Date: 06/07/2001
System Time: 10:23:03

```

Figure 4—5 System Date and Time Setting Screen

In this screen you can perform the field **Synchronize Remote Date & Time** to synchronize the system date/time of the remote SHDSL NTU from the local machine.

4.3.4 Password Change

Set up the password after initial login.

To establish or change the password, select **Main Menu>Configuration> Change Password** to enter the System Change Password screen, which is shown in Figure 4-6.

```

PASSWORD CONFIGURATION

Enter Old Password:      [redacted]
Enter New Password:      [redacted]
Enter New Password Again: [redacted]

```

Figure 4—6 Password Configuration Screen

Note 1: The maximum length of the password is eight characters.

Note 2: Only the alphabetic and numeric characters are available for the password

Note 3: Do not forget to save the configuration files after changing the password.

4.3.5 SNMP and TFTP Configuration

Before connecting to the SNMP management system, configure the following parameters:

- Node IP Address: Specify an IP address for the SHDSL NTU. The default IP address is 172.16.7.37.
- Node IP Subnet Mask: Specify a subnet mask for the IP address. The default subnet mask is 255.255.0.0.
- Gateway IP: Specify a gateway IP address. The default gateway address is 172.16.7.40.
- Trap IP Address 1: Specify the host IP address for traps.
- Trap Port 1: 162 (default), 62000, 62001, 62002 (three optional ports).
- Trap IP Address 2: Specify the second host IP address for traps.
- Trap Port 2: 162 (default), 62000, 62001, 62002 (three optional ports).
- Read Community String: Enter a string for reading identification.
- Write Community String: Enter a string for writing identification.
- Trap Community String: Enter a string for device identification.

You can define up to two trap hosts using the Trap IP address 1 and Trap IP address 2. Each trap port is also changeable. (The default trap port is 162.) The SHDSL NTU sends traps to these hosts when the traps are generated. Moreover, if a trap host is on the same IP subnet as the SHDSL NTU, the trap can be sent to the host directly; otherwise, the trap will be sent to a gateway instead and reach to the trap host eventually. Figure 4-7 shows all of the parameters for SNMP configuration.

The parameters for TFTP configuration are:

- File Server IP Address: Enter the IP address of the TFTP server.
- Software Download Filename: Enter the file name for software upgrade.
- Configuration Database Up/Download Filename: Enter the name of the configuration file.

SNMP CONFIGURATION	Exit	Confirm
Node IP Address:	172.16 .7	.37
Node IP Subnet Mask:	255.255.0	.0
Gateway IP:	172.16 .7	.40
Trap IP Address 1:	0 .0 .0	.0
Trap IP Port 1:	162 62000	62001 62002
Trap IP Address 2:	0 .0 .0	.0
Trap IP Port 2:	162 62000	62001 62002
Read Community String:	public	
Write Community String:	private	
Trap Community String:	alert	
File Server IP Address :	172.16 .7	.7
Software Download Filename:	load.img	
Configuration Database Up/Download Filename:	vcdb.bin	

Figure 4—7 SNMP and TFTP Configuration Screen

4.3.6 SHDSL Interface Configuration

The parameters in the SHDSL Interface Configuration menu are shown in Figure 4-8. The valid range for the field **Data Rate** is 192–2304 kbps in 64 kbps steps (Nx36). The user can also enable **SHDSL Auto Baud** function for a DSL line auto-connection. After the DSL loop is trained, the actual data rate will be displayed on this screen. Different modes of the SHDSL NTU support different ranges of data rates.

Power backoff: In access networks, loop lengths and noise conditions differ significantly from pair to pair. While 13.5 dBm transmit power is required for worst-case noise conditions, many lines will not require such power levels. G.SHDSL includes a power back-off algorithm that enables modems to adjust their transmitting power according to conditions on the line. Operators can use this feature to manage and reduce crosstalk noise on the network.

G.SHDSL Standard: There are three options:

- Annex A (G.922.1 G.SHDSL Annex A compliant)
- Annex B (G.992.1 G.SHDSL Annex B compliant)
- Annex AB

The LT mode supports Annex A and Annex B. The NT mode supports Annex A, Annex B and Annex AB. The default setting for LT is Annex A, and the default setting for NT is Annex AB. If the devices train with their default modes, Annex A will be used.

SHDSL INTERFACE CONFIGURATION	Exit	Confirm
SHDSL AutoBaud Enable:	Disable	Enable
Data Rate(N*64K):1~36	32	
Actual Line Rate(N*64K)	0	
Power backoff:	Disable	Enable
G.SHDSL Standard:	Annex-A	Annex-B

Figure 4—8 SHDSL Interface Configuration Screen

4.3.7 V.35 Configuration

The V.35 Interface Configuration screen shown in Figure 4-9 allows the user to set the signal RTS to **Permanent On** or **From DTE** and to enable the **Tail** function to accept a clock from DTE V.35 interface.

Selected Device: Local		
V.35 INTERFACE CONFIGURATION		
	Exit	Confirm
RTS Permanent On:	Permanent_ON	From_DTE
Tail On/Off:	Tail_ON	Tail_Off
Data Invert:	Normal	Invert

Figure 4—9 V.35 Interface Configuration Screen

4.4 Logout

To log out of the system, move the cursor to the **Logout** field from the main menu by using the **Up** or **Down** key.

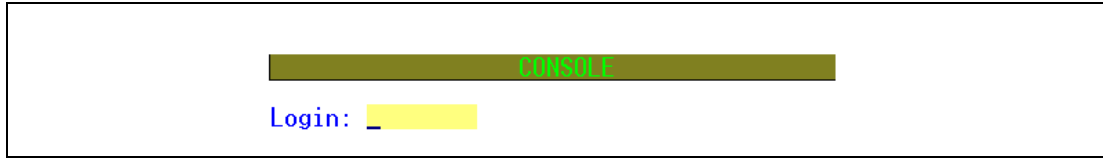
MAIN MENU Select Device Select NE Mode(LT/NT) Configuration Current Alarm & Status Performance Statistics Threshold Setup Alarm History DTE Status Test & Loopback Status Configuration Database Maintenance Reset & Software Download Logout
--

Figure 4—10 System Logout

After pressing the **Enter** key, press any key to login.

CONSOLE Press Any Key to Login..._
--

Then you are prompted to Login once again:



Operation Mode

There are two access privileges for system operation: **read mode** and **write mode**. In Read mode, the user can only view information from the terminal except changing the password. In Write mode, the user can view system information and change system parameters from the terminal. Figure 5-1 shows an indication of system operation mode. **<WRITE>** is displayed in the lower right corner of the screen, showing the system is managed in Write mode.

Up, Down Arrow: Field Move; Ctrl+X: Exit; Enter: Confirm

<WRITE>

Figure 4—11 Operation Mode Indication

Upon initial login you are in Write mode without entering the password. You only need to enter the password after it is set up.

Note: When the password is the same for both Read and Write modes, Write mode always gets a higher priority. You can change the password for either mode by selecting **Main Menu>Configuration> Change Password**.

4.5 Selecting a Device

Select **Main Menu>Select Device** to configure the local or remote SHDSL NTU. The default setting of the **Select Device** is **local**. If you change the field of **Select Device** to **remote** shown in Figure 5-2, you can configure the remote SHDSL NTU via the DSL line.

```
SELECT DEVICE      Exit      Confirm
SELECT DEVICE:Local Remote
```

Figure 4—12 Select Device Menu

The main menu of the remote configuration is a little different from that of the local configuration. Figure 5-3 shows the fields included in the Main Menu: Select NE Node, configuration, Current Alarm Status, Performance Statistics, Threshold Setup, DTE Status, Loopback Status, Configuration Database Maintenance, Reset and Return to Local. The details of these fields are the same as those of the local main menu and have been explained in other sections. The user can select the **Return to Local** field to go back to the local SHDSL NTU configuration.

```
MAIN MENU
Select NE Mode
Configuration
Current Alarm & Status
Performance Statistics
Threshold Setup
DTE Status
Loopback Status
Configuration Database Maintenance
Reset
Return to Local
```

Figure 4—13 Remote Device Configuration Main Menu

4.6 Selecting NE Mode

Select **Main Menu>Select NE Mode (LT/NT)** to configure the NTU for LT (Line Termination) mode or NT (Network Termination) mode. The Select NE Mode Menu is shown in Figure 5-4. The factory default is NT mode.

SELECT NE Mode **Exit** Confirm

SELECT NE: **LT** NT

Figure 4—14 Select NE Mode Menu

When NT mode is selected, the NT LED on front panel will light.

- **NT Mode:** System timing is not configurable in this mode. The default first priority is from **SHDSL Loop**, and the second is from **Internal**.
- **LT Mode:** The user can set the timing to **Internal**, **SHDSL Loop**, **DTE Loop**, or **Independent**.

Chapter 5 Monitoring

The chapter describes performance monitoring, DTE status monitoring, and alarm monitoring.

5.1 DTE Status Monitoring

Selecting **Main Menu>DTE Status** displays the state of the following V.35 interface signals:

- RTS: Request To Send
- CTS: Clear To Send
- DCD: Data Carries Detect
- DSR: Data Set Ready

DTE STATUS	Exit
RTS:	ON
CTS:	ON
DCD:	ON
DSR:	ON

Figure 5—1 DTE Status Screen

5.1.1 Performance Monitoring

Select **Main Menu>Performance Statistics** to enter the SHDSL Performance Data Menu shown in Figure 6-2. Both Near End and Far End performance data can be monitored. The count of performance data is based on a quarter-hour. In the Performance Data Menu, you can view the data of **current quarter hour**, **previous 96 quarter hours**, or **Current & Previous 7 days**. You can also clear the performance data from this menu. Both Near-End and Far-End have same selected fields. The screens for current quarter-hour, previous 96 quarter-hours, and previous 7 days for Near-End are shown in Figures 5—2 to 5—3.

SHDSL Performance Data	Exit
Near End	
Current Quarter	
Previous 96 Quarters	
Current & Previous 7 Days	
Clear Performance Data	
Far End	
Current Quarter	
Previous 96 Quarters	
Current & Previous 7 Days	
Clear Performance Data	
SNR : 0 (dB)_	

Figure 5—4 Performance Data Menu

Four parameters are counted for performance monitoring: ES, SES, UAS, and LOSW. In factory-defaulted setting, the SHDSL NTU will do an auto-refreshing every five seconds during performing current quarter performance. Moreover, the user can also select field **Refresh** to update the monitored data.

- ES (Error Second): A second with one or more CRC error.
- SES (Severe Error Second): A second with five or more CRC errors.
- UAS (Unavailable Second): Cumulative number of seconds in which the interface was unavailable during the measured period.
- LOSW (Loss of Synchronization Word).

NEAR END SHDSL - CURRENT QUARTER PERFORMANCE				Exit	Refresh
Elapsed Seconds: 134					
ES	SES	UAS	LOSW		
0000000	0000000	0000134	0000134		

Figure 5—5 Near-End Current Quarter Screen

In the screen of Previous 96 Quarters Performance, you can press the **Left** or **Right** arrow key on field **Performance Data** to select a monitored parameter such as ES, SES or UAS. After selecting the parameter, press the **Enter** key to view the data for a day.

NEAR END SHDSL - PREVIOUS 96 QUARTERS PERFORMANCE								Exit
Performance Data: ES SES UAS LOSW								
-- ES Last 96 Quarters:								
	1	2	3	4	5	6	7	8
01-08	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
09-16	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
17-24	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
25-32	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
33-40	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
41-48	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
49-56	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
57-64	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
65-72	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
73-80	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
81-88	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000
89-96	0000000	0000000	0000000	0000000	0000000	0000000	0000000	0000000

Figure 5—6 Near-End Previous 96 Quarters Performance Screen

Select **Refresh** to update the monitored data.

NEAR END SHDSL - CURRENT & PREVIOUS 7 DAYS PERFORMANCE					Exit	Refresh
Valid Intervals: 7						
	ES	SES	UAS	LOSW		
Current Day	0000000	0000000	0005690	0005690		
Last 1st Day	0000000	0000000	0000000	0000000		
Last 2nd Day	0000000	0000000	0000000	0000000		
Last 3rd Day	0000000	0000000	0000000	0000000		
Last 4th Day	0000000	0000000	0000000	0000000		
Last 5th Day	0000000	0000000	0000000	0000000		
Last 6th Day	0000000	0000000	0000000	0000000		
Last 7th Day	0000000	0000000	0000000	0000000		

Figure 5—7 Near-End Current & Previous 7 Days Performance Screen

Select **Main Menu>Performance Statistics> Clear Performance Data** to reset the current and history data for both Near-End and Far-End.

NEAR END	SHDSL - CLEAR PERFORMANCE DATA	Exit	Clear
Performance Type: Current History			
Performance Data: ES SES UAS LOSW ALL			

Figure 5—8 Reset Near-End Performance Data Screen

5.2 Threshold Setup

Select **Main Menu>Threshold Setup** to enter the configuration of performance threshold. The unit for ES, SES, UAS, and LOSW is the second. The valid range of the threshold per quarter is from 0 to 900 seconds, and the valid range for a day is from 0 to 86400 seconds. The unit for SNR margin and Loop Attenuation is the decibel. For SNR Margin, the valid range of the threshold is from 1 to 15 dB. For Loop Attenuation, the valid range is from 1 to 127 dB. Once these thresholds are set, an alarm will be generated when a monitored value is greater than the thresholds within the interval.

THRESHOLD SETUP	Exit	Confirm
Parameters	Threshold for quarter	Threshold for day
ES:	900	86400
SES:	900	86400
UAS:	900	86400
LOSW:	900	86400
SNR Margin:1~15	1	
Loop Attenuation:1~127	86	

Figure 5—9 Threshold Setup Screen

5.3 Alarm Monitoring

The Alarm Monitoring screen lets you view current alarm status and alarm history. You can also clear alarms from this screen.

5.3.1 Viewing Current Alarm Status

Select **Main Menu>Current Alarm & Status** to view the device current alarm status. The system provides two classes of alarms: **major** and **minor**. Use the Refresh function to update the status and press the PgUp/PgDn key to switch the page.

CURRENT ALARM STATUS	Exit	Refresh	PgUp	PgDn	PAGE 1
Alarm Type		Class		Time	
01.(SHDSL)Loss of signal		MAJOR		04:02:00 08/07/7209	
02.(V35)Loss of DTE signal		MINOR		04:02:00 08/07/7209	
.....END OF ALARM RECORDS.....					

Figure 5—10 Current Alarm Status Screen

5.3.2 Viewing Alarm History

Select **Main Menu>Alarm History** to view the device's alarm history. The Alarm History screen is shown below. Use the Refresh function to update the status and press the PgUp/PgDn key to change the page. To clear the device's alarm history, select the **Clear** function in the screen.

ALARM HISTORY	Exit	Refresh	Clear	PgUp	PgDn	PAGE 1
Alarm Type		Class		Time		
01.(V35)Loss of DTE signal		MINOR		04:02:00 08/07/7209		
02.(SHDSL)Loss of signal		MAJOR		04:02:00 08/07/7209		
.....END OF ALARM RECORDS.....						

Figure 5—11 Alarm History Screen

Chapter 6 Loopback and Test

The SHDSL NTU provides three kinds of test, which are Loopback, BER Test, and Self-test. Select **Main Menu>Test & Loopback Status** to enter the Test and Loopback Status Menu. This menu has three items. Each item will be described in the following sub-sections.

```

TEST AND LOOPBACK STATUS MENU          Exit
Activate Loopback
SHDSL BER Test
Self Test

```

Figure 6—1 Test and Loopback Status Menu

6.1 Loopback

Select **Main Menu>Test & Loopback Status>Activate Loopback** to perform line loopback, local loopback, remote line loopback, or remote payload loopback on the SHDSL interface, and a local, network or V.54 loopback test on the V.35 interface. These tests can be selected by using the **Up/Down** and **Left/Right** arrow keys and are explained below. After selecting the type of loopback, press the **Enter** key to receive a confirmation.

Note that V.54 loopback is not supported when the data rate is set from 64 kbps (N=1) to 192 kbps (N=3).

```

LOOPBACK MENU                          Exit

SHDSL Interface:
  Loopback Status: Release
  Activate LoopBack: Release Line Local Remote_Line Remote_Payload

V35 Interface:
  Loopback Status: Release
  Activate LoopBack: Release Local Network V.54

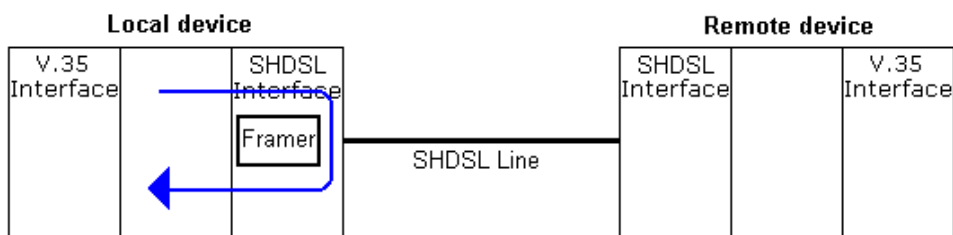
```

Figure 6—2 Loopback Menu

6.1.1 SHDSL Loopback

There are four types of SHDSL loopback.

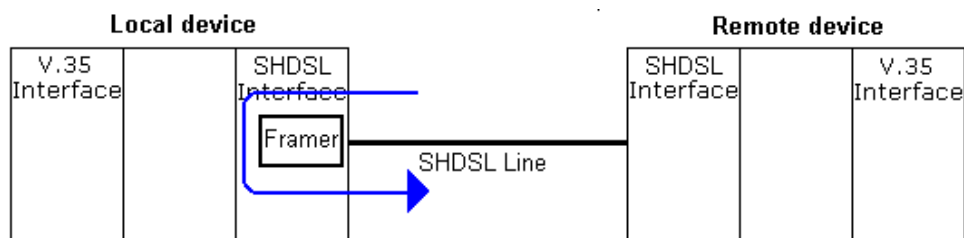
- Local loopback: Performs a loopback toward DTE. This loopback will terminate the SHDSL link.



SHDSL Local Loopback Diagram

Figure 6—3 SHDSL Local Loopback

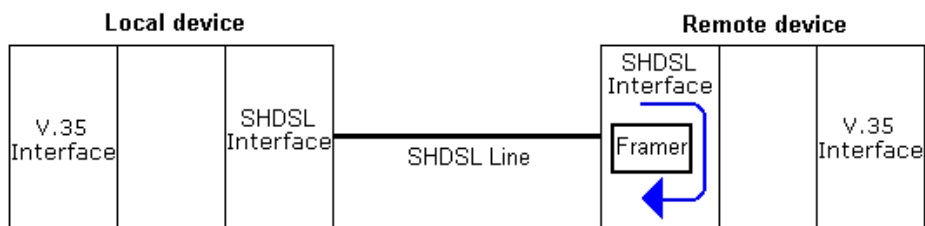
- Line loopback: Performs a loopback toward the line.



SHDSL Line Loopback

Figure 6—4 SHDSL Line Loopback

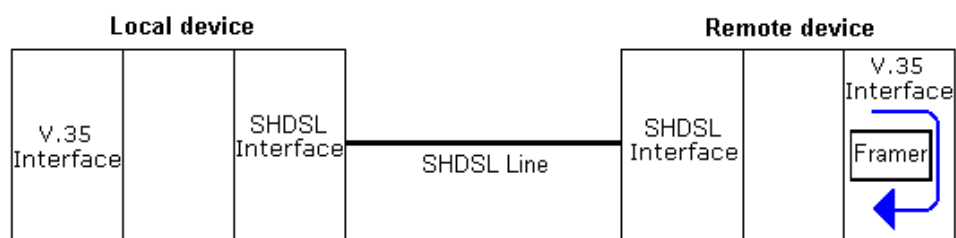
- Remote line loopback.



SHDSL Remote Line Loopback

Figure 6—5 SHDSL Remote Line Loopback

- Remote payload loopback.



SHDSL Remote Payload Loopback

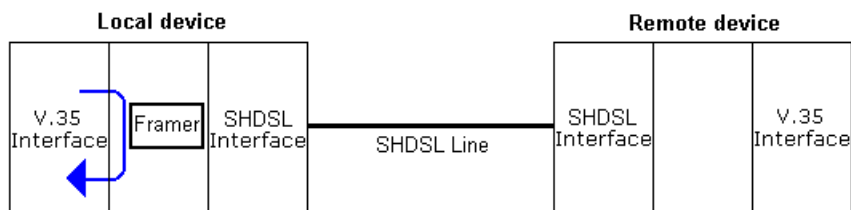
Figure 6—6 SHDSL Remote Payload Loopback

To release a loopback, select Release to return to normal operation.

6.2 V.35 Loopback

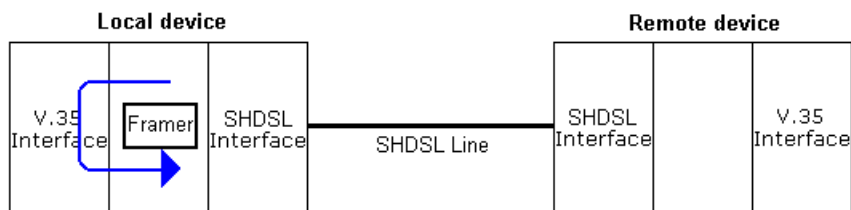
There are three kinds of loopback test performed on the V.35 Interface.

- Local: Performs a local loopback.



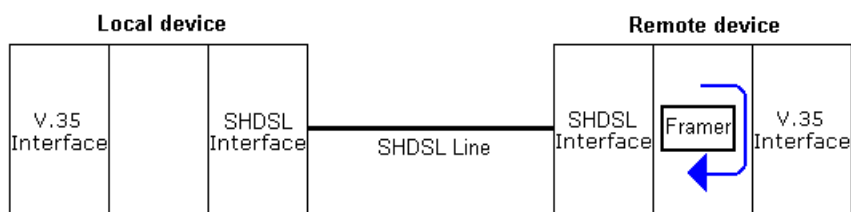
V.35 Interface Local Loopback Diagram

- Network: Performs a network loopback.



V.35 Interface Network Loopback Diagram

- V.54: Performs a remote V.54 loopback. The V.54 loopback is not supported when the data rate is set to 64 Kbps (N=1) to 192 Kbps (N=3).



Remote V.54 Loopback Diagram

To release the loopback, select Release to return to normal operation.

6.3 BER Test

Select **Main Menu>Test & Loopback Status>SHDSL BER Test** to enter the BER test screen. The fields in the screen are described below:

- Test Period: enter the duration for testing. (00:00:00 denotes a continuous test.)
- Test Pattern: 511, 2047 and PRBS ($2^{15}-1$) patterns are available for the test. **Normal** means there is no pattern sent.
- Test Switch: the user has to use the **Up/Down** key to move the cursor to this field and select **Start** to perform the test.

After performing a test, the test result will appear on the screen immediately. The test results include Elapsed seconds, Bit Errors, and Bit Error Ratio. Press the **E** key to stop the test or press the **I** key for the Error Insertion.

During the test, the system will refresh the screen once per second.

```

SHDSL BER TEST                                Exit
TEST CONFIG
  Test Period: 00:00:00
  Test Pattern: Normal 511 2047 PRBS(2^15-1)
  TestSwitch: Start

RESULT  >> Under Test... {E: Stop Test; 1: Ins One Err}
Elapsed Seconds: 3
Bit Errors:      6501072
Bit Error Ratio: 0.50*10E(-0)

```

Figure 6—7 BER Test Screen

6.4 Self-Test

Select **Main Menu>Test & Loopback Status>Self Test** to perform a system self-test. After the test, the system shows the result on the screen. During the test, the traffic will be interrupted.

Chapter 7 Configuration Database

You can save, upload, or download the configuration database from the Configuration Database Maintenance screen. The screen also provides a function to restore the configuration database to the factory default settings. Select **Main Menu> Configuration Database Maintenance** to perform the system maintenance.

```
CONFIGURATION DATABASE MAINTENANCE      Exit
Save Configuration Database
Upload Configuration Database(X_Modem)
Upload Configuration Database(TFTP)
Download Configuration Database(X_Modem)
Download Configuration Database(TFTP)
Save Factory Default to Database
```

Figure 7—1 Configuration Database Maintenance Menu

7.1 Saving Configurations

Select **Main Menu>Configuration Database Maintenance>Save Configuration Database** to save the current configuration. A message as shown below will appear for confirmation. Choose **Save** by using the **Up** or **Down** key. The file is saved in system flash memory.

```
SAVE CONFIGURATION DATABASE              Exit
Do you really want to Save Configuration? Please confirm:
Save
```

Caution: Perform this action after making any change from the menu. Otherwise, the change will be lost after the system is restarted.

7.2 Uploading Configuration Database via X-modem

Select **Main Menu> Configuration Database Maintenance> Upload Configuration Database (X_Modem)** to perform the system configuration file uploading via X-modem. A message shown below will appear for confirmation. Choose **UpLoad** to perform the uploading. Then execute the following procedures.

```
UPLOAD CONFIGURATION DATABASE(X_MODEM) Exit
Do you really want to upload configuration? Please confirm:
UpLoad
```

STEP 1: Select the function for **file transfer (receive/download)** from the terminal emulation program you use.

STEP 2: Select **X-modem** protocol for file transfer.

STEP 3: Enter the **file name** with the directory to be received.

STEP 4: Execute the file transfer function.

Note: The maximum wait time for the system is 50 seconds. If a timeout message appears, repeat the above procedure.

7.3 Uploading Configuration Database via TFTP

Select **Main Menu> Configuration Database Maintenance> Upload Configuration Database (TFTP)** to upload the system configuration file via a TFTP server. A message as shown below will appear for confirmation. Choose **UpLoad**.

```
UPLOAD CONFIGURATION DATABASE(TFTP) Exit
Do you really want to upload configuration? Please confirm:
UpLoad
```

Note: Go to the **Main Menu>Configuration>SNMP Configuration** to enter the IP address of the TFTP server and the file name you would like to upload before performing the upload.

7.4 Downloading Configuration Database Via X-modem

Select **Main Menu> Configuration Database Maintenance> Download Configuration Database (X_Modem)** to download the system configuration file via X-modem. A message as shown below will appear for confirmation. Choose **DownLoad** to perform the downloading, then perform the following procedure. The configuration files will be saved in flash memory.

```
DOWNLOAD CONFIGURATION DATABASE(X_MODEM)      Exit
Do you really want to download configuration? Please confirm:
Download
```

STEP 1: Select the function for **file transfer (send/upload)** from the terminal emulation program you use.

STEP 2: Select the **X-modem** protocol for file transfer.

STEP 3: Enter the **file name** with the directory to be sent.

STEP 4: Execute the file transfer function.

Note: The maximum wait time for the system is 50 seconds. If a timeout message appears, repeat the above procedure.

7.5 Downloading Configuration Database via TFTP

Select **Main Menu> Configuration Database Maintenance> Download Configuration Database (TFTP)** to download the system configuration file via an TFTP server. A message as shown below will appear for confirmation. Choose **DownLoad**.

```
DOWNLOAD CONFIGURATION DATABASE(TFTP)      Exit
Do you really want to download configuration? Please confirm:
Download
```

Note: Go to the **Main Menu>Configuration>SNMP Configuration** to enter the IP address of the TFTP server and the file name you would like to download before performing the downloading.

7.6 Setting Configuration Database to Factory Default

Select **Main Menu> Configuration Database Maintenance> Save Factory Default to Database** to restore the system configuration file to factory defaults. A message as shown below will appear for confirmation. Choose **Save** to perform the restoration by using the **Up/Down** arrow key. The system will be restarted after the confirmation and the configuration will be restored to the default setting.

```
SAVE  FACTORY DEFAULT TO DATABASE      Exit
Do you really want to Save  Factory Default Configuration?
After save ,system will RESET!! Please confirm:
Save
```

Chapter 8 System Reset and Software Download

For system reset and system software download, select **Main Menu> Reset & Software Download**.

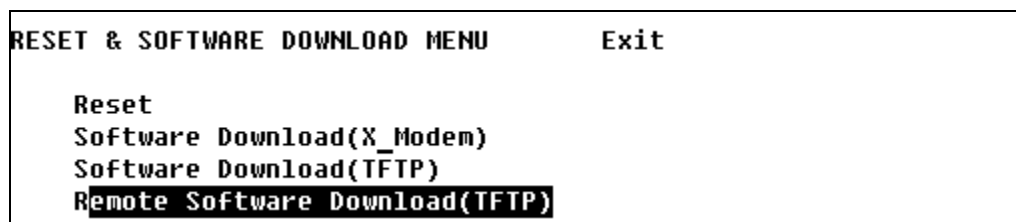
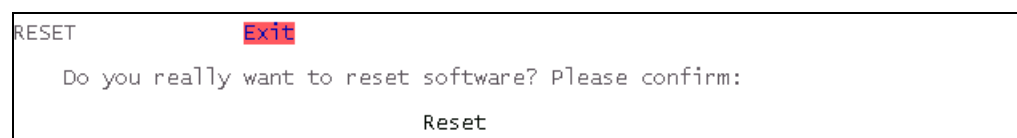


Figure 8—1 Reset & Software Download Menu

8.1 Reset

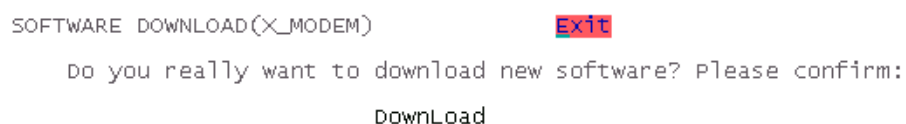
Select **Main Menu> Reset & Software Download>Reset** to perform a system reset. A message as shown below will appear for confirmation. Choose **Reset** to perform the system reset by using the **Up/Down** key.

It is necessary to reset the device after a software upgrade.



8.2 Software Download via X-modem

Select **Main Menu> Reset & Software Download> Software Download (X_Modem)** to perform a system software download via X-modem. A message as shown below will appear for confirmation. Choose **DownLoad** to execute the software download by using the **Up/Down** key. Then perform the following procedure. The application software will be updated.



STEP 1: Select the function for **file transfer (send/upload)** from the terminal emulation program you use.

STEP 2: Select the **X-modem** protocol for file transfer.

STEP 3: Enter the **file name** with the directory to be sent.

STEP 4: Execute the file transfer function.

Note: The maximum wait time for the system is 50 seconds. If a timeout message appears, repeat the above procedure.

8.3 Software Download via TFTP

STEP 1: Go to the **Main Menu>Configuration>SNMP Configuration** screen to enter the IP address of the TFTP server and the file name you would like to download before performing the software upgrade.

SNMP CONFIGURATION	Exit	Confirm
Node IP Address:	172.16 .7 .37	
Node IP Subnet Mask:	255.255.0 .0	
Gateway IP:	172.16 .7 .40	
Trap IP Address 1:	0 .0 .0 .0	
Trap IP Port 1:	162 62000 62001 62002	
Trap IP Address 2:	0 .0 .0 .0	
Trap IP Port 2:	162 62000 62001 62002	
Read Community String:	public	
Write Community String:	private	
Trap Community String:	alert	
File Server IP Address :	172.16 .7 .7	
Software Download Filename:	load.img	
Configuration Database Up/Download Filename:	vcdb.bin	

STEP 2: Select **Main Menu> Reset & Software Download> Software Download (TFTP)** to perform the system software download via the TFTP server. A message as shown below will appear for confirmation. Choose **DownLoad** by using the **Up/Down** key.

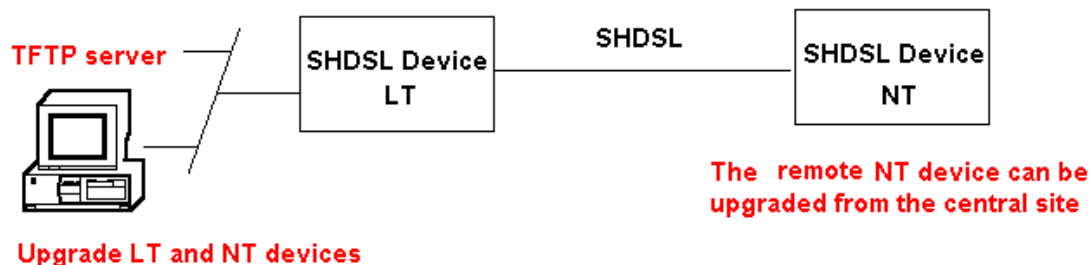
```
SOFTWARE DOWNLOAD(TFTP)      Exit
Do you really want to download new software? Please confirm:
                               DownLoad
```

STEP 3: Select **Main Menu> Reset & Software Download> Reset** to reset the unit.

```
RESET      Exit
Do you really want to reset software? Please confirm:
                               Reset
```

8.4 Remote Software Upgrade via TFTP

The remote upgrade allows upgrading the NT device via the central LT device.



STEP 1: Go to the **Main Menu>Configuration>SNMP Configuration** to enter the IP address of the TFTP server and the file name you would like to download.

SNMP CONFIGURATION	Exit	Confirm
Node IP Address:	172.16 .7 .37	(Change to IP Address, Subnet Mask, and Gateway IP will take effect after system is restarted.)
Node IP Subnet Mask:	255.255.0 .0	
Gateway IP:	172.16 .7 .40	
Trap IP Address 1:	0 .0 .0 .0	
Trap IP Port 1:	162 62000 62001 62002	
Trap IP Address 2:	0 .0 .0 .0	
Trap IP Port 2:	162 62000 62001 62002	
Read Community String:	public	
Write Community String:	private	
Trap Community String:	alert	
File Server IP Address :	172.16 .7 .7	
Software Download Filename:	load.img	
Configuration Database Up/Download Filename:	vcdb.bin	

STEP 1: Select **Main Menu> Reset & Software Download> Remote Software Download (TFTP)** to perform the system software download via the TFTP server. A message as shown below will appear for confirmation. Choose **Download** by using the **Up/Down** key. The application software will be updated.

REMOTE SOFTWARE DOWNLOAD(TFTP)

Exit

Do you really want to download new software? Please confirm:

DownLoad

Chapter 9 Troubleshooting

Event	Checking Procedure
VT100 connection failure	1. Check the RS-232 connection. 2. Check the RS-232 cable. A straight-through cable is required. 3. Check the terminal emulation program. It must be VT100-compatible. 4. Check console session parameters. The default baud rate is 38400.
Login deny	1. Password incorrect. 2. Incorrect capitalization. The password is case-sensitive.
No LED display	Check power connection.
No Response from LAN port	1. Check network connection. 2. Check SNMP configuration.
DSL Training failure or the training period has exceeded three minutes	1. Reboot the SHDSL NTU and retrain. 2. Check the status of the DSL LOS LED. If this LED keeps blinking for over three minutes (meaning the device cannot train), the line quality is poor or the link distance is too long for the SHDSL NTU to train. Contact your service provider.

Specifications

Specification	Criteria
Diagnostics:	
Loopback Function	DSL
Loopback Types	Local Loopback, Remote Loopback, V.54 Loopback
Built-in test patterns	511, 2047, PRBS ($2^{15} - 1$)
Dimensions	Width: 9.5 in (242 mm) Height: 1.7 in (44 mm) Depth: 6.6 in (167 mm)
DTE Interface:	
V.35 Data rate	Nx64 Kbps, N=1–36
Connector	M34 Socket
Environmental Requirements:	
Temperature	0–50 degrees Celsius
Humidity	5%–95% Relative Humidity (Non-Condensing)
Management:	
Local Interface	RS-232 DB9 for VT100
SNMP Management	10BaseT Ethernet port, Embedded SNMP agent
Remote Management	Through Embedded Operations Channel
Power	110 VAC or 220 VAC
SHDSL Line Interface:	
Encoding Scheme	TC-PAM
Media	Single non-loaded twisted pair
Line Impedance	135 Ohms
Line rate	Per ITU-T G.991.2 (G.SHDSL)
Payload rate	Nx64 Kbps, N=1–36
Connector	RJ45 Jack
Timing	Loop, Internal, DTE

Note: Specifications are subject to change without notice.